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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

21.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **24520**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	815	815	3.3	96.7	95-100
22.4	5250	6065	24.7	75.3	60-80
11.2	5000	11065	45.1	54.9	40-60
4.75	4150	15215	62.1	37.9	25-40
2.36	3590	18805	76.7	23.3	15-30
0.600	2615	21420	87.4	12.6	8-22
0.075	2805	24225	98.8	1.2	0-8

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

21.07.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014

Date of Testing : 21.07.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25600**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	880	880	3.4	96.6	95-100
22.4	5400	6280	24.5	75.5	60-80
11.2	5590	11870	46.4	53.6	40-60
4.75	4010	15880	62.0	38.0	25-40
2.36	3900	19780	77.3	22.7	15-30
0.600	2590	22370	87.4	12.6	8-22
0.075	2945	25315	98.9	1.1	0-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/AIV/2014-15 21.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	21.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	306	
4	Aggregate Impact value = percent fines	21.30	20.73	
	100* (W_2/W_1)%			**21.01**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/S-T/2014-15 21.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager**, KRIDL, Bangalore.
Name of Work	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	21.07.2014

Result : Flakiness Index = **12.35%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index 26.25%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/AIV/2014-15 24.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	24.07.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.63	20.79	**20.71**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Shape_T/2014-15 : 24.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 24.07.2014

Result : Flakiness Index = **11.06%**

Elongation Index = **13.29%**

Result : Combined Flakiness & Elongation index **24.35%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Stripping/2014-15 . 24.07.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	24.07.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Bitumen/2014-15 24.07.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
SAMPLE I/D	Asphalting to Raghavendra Colony Roads in Ward No.11
DATE OF TESTING	24.07.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	472
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23	28.00
7. Bitumen content in %	4.60	5.60
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	37.56	7.87	7.87	92.13	90-100
4.75	260.3	54.57	62.44	37.56	35-51
2.36	57.23	12.00	74.44	25.56	24-39
1.18	40.52	8.49	82.94	17.06	15-30
0.3	29.85	6.26	89.19	10.81	9-19
0.075	27.56	5.78	94.97	5.03	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	27.96	5.59	5.59	94.41	90-100
4.75	242.5	48.50	54.09	45.91	35-51
2.36	92.56	18.51	72.60	27.40	24-39
1.18	53.14	10.63	83.23	16.77	15-30
0.3	32.45	6.49	89.72	10.28	9-19
0.075	22.85	4.57	94.29	5.71	3-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Sp_Wa/2014-15

24.07.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads and Asphalting to Raghavendra Colony Main Roads in Ward No.11, (Kuvempunagara) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/175/6/2014-15 Dated: 19.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	24.07.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2022	2023	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1267	1268	
4	Weight of saturated surface dry aggregate in air	W_3 g	2019	2020	2024	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	753	756	
6	Weight of oven dried aggregate	W_4 g	2010	2012	2004	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.669	2.672	2.651	2.664
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.702	2.701	2.723	2.708
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.45%	0.40%	1.00%	0.61%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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